

National Science Foundation Project on WWW-Based Education in IT

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ABSTRACT

The National Science Foundation (U.S.A) project # DUE-0196015 [1] aims to provide online educational materials for courses in Information Technology (IT) and Computer Science (CS) areas at the 2-year and 4-year college level.

Keywords

WWW-based education, online education, WWW-based course curricula and courseware, online degree programs in IT area.

1. INTRODUCTION

The National Science Foundation (NSF) project on Course, Curriculum and Lab Improvement and Educational Material Development (NSF CCLI-EMD Project) # DUE-0196015 is helping increase the pool of well-educated and highly skilled Information Technology (IT) workers.

The project addresses the severe current national shortage in the IT workforce (the lack of about 400,000 IT workers in 1999) that is, unfortunately, projected to persist well into the 21st century (the projected lack is about 1.3 million IT workers in 2006) [2,3,4,5,6]. The aforementioned project is hosted by Bradley University, IL, U.S.A., and, particularly, by the NSF-Bradley Center on Web-Based Education at Bradley University.

2. PROJECT GOAL AND OBJECTIVES

The proposed NSF CCLI-EMD Project has two goals:

1) Accelerating the rate of graduation of Information Engineering Technology (IET) students through the active use of innovative OEM and teaching and learning technology other than Classroom-Based Training (CBT), namely Web-Based Training (WBT), that can be delivered into the workplace and the home at any time. In other words, the traditional "teaching-by-telling" mode of IET education will be complemented (not displaced) by an innovative active "learning-by-doing" online model of IET education. (In this paper, the term "online" implies both Web-based synchronous and asynchronous types of communication/learning).

2) Expanding the impact of IET education on various groups of population such as traditional high schools/college/university students and non-traditional students and learners at centers of

distance learning, Weekend Schools, Summer Institutes, Adult Vocational Centers, Career Development Centers, etc.

Given the broad goal of the this project, the specific aims of the NSF-CCLI-EMD project are to:

1) Develop online educational materials for twelve (12) IET undergraduate courses, provide wide "beta"-testing of developed OEM, organize and store IET OEM in form of "IET Courseware Cube".

2) Use actively innovative cost-effective and time-effective Web-based learning and teaching technologies, and "active learning" paradigm of education that are ideally match goals and objectives of IET education of a broad range of traditional and non-traditional groups of students and learners.

3) Design and develop a specialized "Online IET Courseware" Web server and Web page (available 24/7/365) that will store the developed undergraduate IET OEM and disseminate project-related information nationwide and worldwide.

4) Create a solid foundation for at least two Associate of Applied Science (AAS) and one Bachelor of Science (BS) online degree programs in IET area.

5) Establish IET "K-16/IT Industry" consortia with more than 80 project partners – representatives from various U.S. community colleges, universities, IT companies/businesses, and professional associations/ societies, and city school districts. Establish articulation agreements between participating educational institutions. Establish coop/internship opportunities and vendor-specific certificate programs for IET "online" students and graduates of online programs.

6) Create a Project Advisory Board (about 20 experts) to ensure top quality of project activities and products.

7) Produce IET OEM of high quality by using a variety of effective evaluation procedures. Provide various forms of formative and summative discussion and evaluation of all project activities and products.

8) Disseminate project products nationwide by means of various aggressive dissemination procedures with special

attention to free distribution of project products to a) historically black and Hispanic educational institutions, b) Tech Prep Consortia in all 50 states, and c) K-16 institutions in rural areas of the U.S.

9) Provide constant active training of faculty and teachers focused on design, development and implementation of OEM, the Web-based innovative teaching and learning technologies and techniques, and state-of-the-art Web-based instructional (WBI) tools.

10) Provide sustainability of project activities by self-sustained distribution of project products by means of 1) production and commercial distribution of CD ROMs with IET OEM, and 2) pre-paid services of the project dedicated Web.

3. PROJECT TARGETED AUDIENCE

Project products are primarily aimed at various groups on students and life-long mature learners in the United States, especially individuals such as:

- 1) Students of traditional K-16 institutions who find the online learning a convenience;
- 2) Adult students who travel a great deal, or have strong commitments for family and/or businesses, and therefore cannot attend weekly on-campus classes;
- 3) Students who must transfer to another city/state before completing their degree;
- 4) Adult students at military bases far from U.S. traditional educational institutions;
- 5) Students in rural areas of the U.S.;
- 6) Disabled students who have no opportunity to attend classes and lab sessions at colleges/universities;
- 7) Potential international students with Internet connectivity anywhere in the world that are willing to take online courses at US K-16 institutions with no visits or minimal numbers of visits to the United States.

4. PROJECT EXPECTED OUTCOMES

The primary outcomes of the proposed project are expected to be:

- 1) A set of CD-ROMs that will contain OEM for twelve (12) IET undergraduate courses. Each course will have three (3) levels of learning such as introductory, intermediate, and advanced levels.
- 2) A project "Online IET Courseware" Web server and Web page; it is expected that eventually this server will contain OEM for forty-eight (48) courses of four (4) IT employment tracks.
- 3) Three (at least) pilot online undergraduate IET programs in participating institutions; several other colleges - project partners, are expected to start their activities on establishment of their own online programs in IT by completion of this project or even before.

4) Project-related articles, papers, presentations, surveys, databases of student FAQ, and evaluation/testing materials.

5) A large number of faculty who will be re-trained in WBT area;

6) A designed, developed, and tested "easy-to-replicate" nationwide model of the IET.

5. CONCLUSION

The proposed NSF -CCLI-EMD project # DUE 0196015:

1) addresses severe national needs in IT workforce, and is aimed on massive production of a well-trained and highly-skilled IT workforce nationwide using innovative Web-based teaching and learning technologies,

2) is focused on development, widespread site testing and careful evaluation of IET OEM and efforts to promote their effective implementation in K-16 U.S. institutions,

3) has a series of twelve (12) undergraduate advanced IET courses as a scope,

4) is expected to produce innovative IET OEM of a top quality and significance appropriate for national distribution, adaptation, and implementation,

5) cuts across academic disciplinary boundaries by developing IET OEM for three levels of learning, specifically a) Introductory Level, b) Intermediate Level, and c) Advanced Level, that may be used by students from various major areas and with different levels and types of background in the IET area.

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7. REFERENCES

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- [4] World Information Technology & Service Alliance at [<http://www.witsa.org>]
- [5] U.S. Department of Commerce, Bureau of Economic Analysis at [<http://www.bea.doc.gov>]
- [6] Information Technology Association of America at [<http://www.ita.org>]